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FROM DESERT STORM TO 2025:

CLOSE AIR SUPPORT IN THE 21ST CENTURY

by

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Abstract

As the U.S. Air Force attempts to resolve force structure requirements with decreasing military budgets, multi-role aircraft are gaining acceptance as economical solutions. Unfortunately, close air support (CAS) has few mission requirements that are compatible with more traditional air combat roles. Despite this fact, current and future force planning is attempting to force the CAS mission on already saturated multi-role forces. The U.S. Air Force must view CAS as a specialized mission that requires specifically designed aircraft and specially trained pilots. Recognition of this fact is crucial to ensuring that the U.S. Air Force is prepared to meet the challenges of CAS in the future.

To prove such a position, it is necessary to demonstrate that CAS is a specialized mission that can only be adequately performed by dedicated CAS forces. Once this is accomplished, a continuing future need for such specialized capabilities must be established. This will be achieved by showing that U.S. combat experiences over the current decade have constantly required the introduction and support of ground forces. From this foundation, reasonable predictions show that few external influences are likely to change such requirements in the future. As such, the U.S. Air Force must be prepared to support ground troops with dedicated CAS forces into the 21st century.

Chapter 1

Introduction

Close air support (CAS) is clearly one of the most demanding missions assumed by modern air forces. It requires detailed and complex coordination, supremely accurate weapons delivery and often forces CAS aircraft to operate in the heart of enemy threat envelopes for extended periods of time. While the U.S. Air Force has never been an "enthusiastic" advocate of CAS, Air Force planners have historically ensured that quality aircraft and pilots were available for the CAS mission. From the P-47 Thunderbolt and A-1 Skyraider to the A-10 Thunderbolt II, CAS aircraft have proven to be well designed and ultimately capable of supporting friendly ground forces.[1] Unfortunately, this trend may be changing.

Following the overwhelming victory of coalition forces in Desert Storm, some air power advocates have begun to declare that technological superiority has finally caught up with air power theory. They claim that the pioneering visions of Mitchell and Douhet have finally been vindicated through advanced targeting and sophisticated aircraft.[2] They conclude that future forces should rely on these advanced weapons to overwhelm any potential adversary with precision destruction from the air. Such thinking is driving the procurement of both the F-22 and Joint Strike Fighter as high technology, multi-role answers to missions previously the domain of specialized strike aircraft. While it is

difficult to argue with the achievements of air power in Desert Storm, such success creates difficult questions. Will the next conflict mirror the situation in Iraq and Kuwait? Will air power be the decisive factor in the next war? Are protracted engagements by ground forces a thing of the past? If the answers are yes, then the relegation of the CAS mission into further obscurity may be justified. However, recent history indicates trends for the future that shows military conflict will continue to be an extremely diverse proposition.

Research Statement

The U.S. Air Force must view CAS as a specialized mission that will play an important role on any future battlefield. Recent U.S. combat experiences support this statement and current trends point to a future with similar combat requirements. These facts will require the Air Force to modify current procurement programs to include forces exclusively dedicated to the demands of CAS. Recognition of this requirement is critical to ensuring that the U.S. Air Force is prepared to meet the challenges of combat into the 21st century.

Research Method and Limitations

For the position articulated above to be accepted, two facts must be proven correct. First, it is necessary to investigate why CAS is a specialized mission that can only be adequately performed by dedicated CAS forces. Second, CAS must be seen as a critical requirement for combat in the future. After all, the most capable and proficient CAS forces in the world will be of limited value if the mission itself is not required for the successful prosecution of military combat in the years ahead. To establish the need for

specialized CAS forces in the future, it is necessary to show that CAS is currently a critical element of modern combat scenarios. With this foundation, it is then possible to determine if reasonable expectations for the future will continue to demand similar capabilities. Given this argument, this research effort will be structured in the same manner, beginning with the concept that CAS must be regarded as a unique and specialized mission.

While every task performed by modern air forces can be described as having unique employment requirements, these attributes are often beneficial across a wide variety of potential uses. For instance, stealth technology works to protect threat suppression aircraft as readily as it does an air superiority fighter. These compatible attributes have given rise to the concept of incorporating multi-role capabilities into a single aircraft type. This philosophy is evident in the Air Force's F-16 Falcon and is a driving force behind the capabilities being incorporated into aircraft such as the F-22 Raptor and the Joint Strike Fighter. Unfortunately, CAS is at odds with nearly every other type of air combat mission. Understanding why this is true reveals a significant flaw in the logic of attempting to force the CAS mission on multi-role fighters that are designed for a variety of similar tasks but which, as a whole, have little in common with CAS. Once the specialized nature of CAS is accepted, it is then necessary to validate the need for such unique capabilities.

Military conflicts of the current decade have been dramatically changing since the demise of the Soviet threat in Europe. U.S. military experiences during this period hold significant lessons for CAS forces of the future. By establishing the preeminent need for specialized CAS forces in recent conflicts, it is possible to evaluate the potential for

similar needs in the future. The review in this paper will include U.S. military operations in Desert Storm, Bosnia-Hercegovina and Somalia. The history of these conflicts support the position that dedicated CAS forces have been presented numerous employment opportunities during these military operations. Still, historical verification of past requirements is not enough. The final step is to show that the requirement, for specialized CAS forces, can reasonably be expected to continue in the future.

It is naive to believe that any estimate of the future will turn out to be completely accurate. However, by applying the trends of recent military conflict to the evolving social and political world climate, it is possible to make some reasonable predictions. This effort is not intended to advocate that U.S. military planning should be designed only for the proffered scenario. On the contrary, such action would be as foolish as expecting all future conflict to mirror the experiences of Desert Storm. The prudent approach must be to recognize the most likely of multiple possibilities and prepare forces to meet a variety of these challenges. While it is important to understand the scope of this research, it must also be clear what is not intended.

While the issue of which service should be the executive agent for CAS is important to the discussion in terms of basic abilities, no attempt will be made to argue in favor of one service over another for this authority. Likewise, this research is not designed to be a "soapbox" for promoting a particular CAS aircraft at the expense of other alternatives. Finally, it must be noted that the author is a career CAS pilot with 1900 hours of flight time in the A-10 and 38 combat missions in Desert Storm. Throughout this effort, every attempt will be made to recognize and fairly represent this potential bias. This research is

of obvious interest to CAS pilots, however, it is also important to the wider community of joint combat forces.

In the current environment of joint service integration, all combat elements must understand the strengths and limitations of each combat element. With respect to specialized CAS capabilities, any potential recipient of this type of support must be aware of what can be provided. They must also understand the implications of what support may not be available should the U.S. Air Force elect to continue eroding the specialized nature of CAS.

Notes

[1] B. Franklin Cooling, ed. *Case Studies in the Development of Close Air Support* (Washington D.C.: Government Printing Office, 1990), 250, 441.

[2] Richard H. Shultz, Jr. and Robert L. Pfaltzgraff, Jr. ed. *The Future of Air Power in the Aftermath of the Gulf War* (Maxwell AFB: Air University Press, 1992), 11-12.

Chapter 2

The Special Nature of CAS

The most important aspect of CAS that makes this mission completely different from all other types of modern air combat is the need to fly in close proximity to the target area. These profiles expose CAS aircraft to a variety of anti-aircraft artillery (AAA) and infrared (IR) surface to air missile (SAM) systems. Such a requirement is alien in a technological world that possesses precision guided munitions that can be delivered from extremely long ranges with tremendous accuracy. Why is such a capability so important to CAS operations? To answer this question we must look at the accepted definition of CAS.

Joint Publications define CAS as, "Air action by fixed and rotary-wing aircraft against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces."[1] On face value, this sounds like a good definition. However, a problem arises when trying to determine what the term "close proximity" really means. To some, this measurement includes any distance where friendly forces require integration so weapons can be employed in a coordinated and synergistic manner. Historically, such a dividing line was useful since ground combat weapons possessed limited range. By default, these limited ranges resulted in the potential for all CAS missions to place friendly forces in jeopardy

of fratricide should CAS weapons go astray. As modern ground weapons reach further into the battle area, however, the term close proximity becomes confusing. With modern surface combat systems, destruction of a target several miles from ground forces certainly requires close coordination with the ground force fire plan—but it is not CAS. A more accurate description of this event would be air interdiction (AI) under ground control and coordination. Detailed coordination is indeed required to gain unity of effort but, in reality, any strike aircraft with a compatible radio should be capable of this type of action. For CAS forces today, close proximity must be defined as the distance where active terminal control from the ground is required to ensure the prevention of fratricidal damage to friendly ground forces as a result of the weapons being employed.

Such a definition is useful in the evaluation of CAS forces because any platform capable of safely and accurately delivering weapons within this definition will, by default, also be capable of weapons employment at greater ranges. Unfortunately, the ability to safely employ weapons far from enemy troops does not guarantee a corresponding ability to conduct operations where fratricide is a distinct possibility. The reason why force planners are not willing to step up to this distinction is that, by doing so, the mission becomes much more complicated.

In a recent demonstration of the ability of the F-16 to perform the CAS mission, no attack was performed that required the pilot to identify the location of friendly ground forces in relation to the target.[2] Such demonstrations do not prove an ability to perform the CAS mission. They simply validate that the aircraft can conduct interdiction strikes with target updates from the ground. To prove a true CAS capability, such tests must show that CAS forces can build a clear picture of both friendly and enemy positions and

rain destruction on the enemy while keeping friendly forces safe. In order to accomplish this, CAS pilots must get close to their work and, in turn, risk exposure to enemy threat systems.

The Need for Low Altitude Survival

To illustrate why CAS forces must be able to survive in the low altitude environment, consider the pinpoint of light, commonly referred to as the "pipper," used by strike pilots to aim weapons. Even at altitudes as low as 5,000 feet, normal attack distances can result in the aiming reference covering more than 120 feet of the ground surface.[3] In such cases, the aiming reference itself covers far more area than the size of the vehicle being targeted. With precision weapons, this problem can be reduced. However, they do little for the same issue as it applies to distinguishing enemy from friendly targets. A more universally understood example for this situation will be helpful.

A driver can easily determine the color, make and model of a car traveling 20 feet away on a highway. Now consider this same vehicle at a distance of 1.5 miles (approximately 10,000 feet) and assess what can be determined. Finally, place this car under trees or a net made to look like the road surface. In separating friendly from enemy forces, there are only two methods for improving the odds. The driver must get closer to the car or bring the car closer to the driver.

For CAS, getting closer to the target means flying in the threat environment. Bringing the target closer to the pilot requires the use of magnification or image enhancement systems such as a forward-looking infrared (FLIR) system.[4] While such systems are extremely valuable in identifying targets, they also limit the pilot's field of

view. This limitation degrades the ability to maintain awareness of how the target fits into the wider tactical picture, especially with respect to maintaining orientation with friendly forces. Use of target enhancement devises also lead to problems for controlling CAS strikes.

Weapons Capabilities

Precision weapons provide unique capabilities and contribute a great deal to successful air strikes. Unfortunately, these weapons pose a difficult problem for CAS. Assuming that close support requires detailed control from the ground, Forward Air Controllers must be able to tell where CAS aircraft are aiming their weapons.[5] With unguided weapons, observing where the aircraft is positioned in relation to the target allows controllers to make these determinations. Precision weapons, however, can be delivered from much greater distances and serve to defeat the ability of airborne or ground controllers to make a determination as to where the weapon will impact. An F-16 wing commander has claimed that CAS aircraft need to be fast enough to employ such precision weapons.[6] Yet, such assertions must be tempered with the knowledge that these weapons are useless, if clearance to employ them is never granted. This is not to say that precision weapons have no role in the CAS environment. Instead, it must simply be remembered that, for CAS, precision means target accuracy and not the ability to remain far outside potential threat areas.

Another weapon issue for CAS platforms is the overall load capability of each aircraft. CAS aircraft must have the ability to bring a large number of weapons into a CAS scenario for a variety of reasons. The logical benefits of a large and varied weapons load are obvious from an employment aspect and will not be expanded further. What is

not so obvious is the factor of time in employing these weapons effectively in a CAS scenario.

Loiter Capability

In a typical CAS scenario, the pilot must complete a variety of functions before ever releasing the first weapon. First, contact must be established and authenticated with the controlling authority, along with transmission of a variety of information including the number and type of strike aircraft, weapons load and amount of time available for the attack. Following this administrative function, controlling authorities must brief the strike aircraft on the ground situation and target area threats. At this point, target briefings must be passed and CAS aircraft must begin the process of sorting targets from friendly forces.[7] This coordination can be a time consuming process and it is not uncommon for the process to take upwards of 15 to 20 minutes if the ground combat is taking place in close quarters. Obviously this leads to a requirement that CAS aircraft be designed with fuel capacities that allow extended flight over the target area. With respect to the weapons issues stated above, however, it also demands that each CAS aircraft be capable of delivering a large amount of ordnance once this coordination has been completed. To do otherwise simply ensures that far more time is spent coordinating with multiple fights of different aircraft rather than putting weapons on the target. This coordination must take place if pilots are to ensure that friendly forces do not fall victim to fratricide.

The Identity Crisis

One of the most tragic lessons from recent combat experiences is that fratricide is still a problem on the modern battlefield. Visual vehicle markings such as an inverted "V" painted on coalition vehicles during Desert Storm have proven to be insufficient.[8] Technology is being applied to solve the problem and includes such prospects as electronic identification of friendly forces and rapid information transfer through the use of automatic target handoff systems (ATHS).[9] At present, these systems have not proven to be capable of solving all the problems of friendly identification. The one certainty for future CAS aircraft is that any proposed design must address this issue. Until such technology meets the challenge, separating friendly from enemy forces will continue to rely on the individual skill of the CAS pilot. Perfection of these skills requires intensive and constant training.

Training Considerations

Of all the issues discussed so far, concerning the proper design of future CAS forces, pilot training is one of the strongest arguments against the use of multi-role CAS aircraft. Employing weapons in the midst of friendly ground forces requires pilot skills that must be practiced on a continuing basis. From the author's own CAS experience, there is never a point when CAS pilots can not improve these skills through continual training for the mission. The difficulty with multi-role strike aircraft is that they require pilot capabilities for a vast range of possible combat tasks. The F-16 alone lays claim to missions including CAS, AI, threat suppression, and counter air roles. The unique nature of the demands of CAS suggest that while multi-role fighters can perform a variety of

functions, their usefulness as precision, troops-in-contact, CAS platforms is degraded by inadequate concentration on this specific mission.

The Tip of the Iceberg

This chapter has highlighted only the major issues that should be addressed when planning for capabilities of future CAS forces. It has not even begun to consider the specialized tasks that are a subset of these general employment requirements. The problem only becomes more complicated when missions like night CAS, Forward Air Control and Combat Search and Rescue (CSAR) are introduced. Even without discussing these issues, it can be seen that CAS is not a mission to just "add on" to the existing capabilities of multi-role fighter aircraft. This is not to say that multi-role aircraft are incapable of performing some CAS functions. The question for force planners is whether the specialized requirements for CAS aircraft and pilots should be less than optimum when considering the tradeoffs needed to balance limited recourses against multiple mission requirements. Put simply, should the U.S. Air Force accept a limited CAS capability in order to place more emphasis on higher technology systems? The answer to this question depends on what type of warfare will make up the majority of future conflicts. If such conflicts will center on low technology combat where ground troops will be regularly exposed to close in fighting, then relegating CAS to the position of an additional capability is clearly inappropriate. However, if future conflict will be characterized by high technology clashes between modern forces then perhaps the current trend towards multi-role capabilities is justified. To make such a determination, it is time to review recent combat experiences, to frame likely scenarios for future conflict.

Notes

[1] Joint Chiefs of Staff, *Joint Publication 3-56.1, Command and Control for Joint Air Operations* (Washington D.C.: Director for Operational Plans and Interoperability (J-7), 1994), GL-5.

[2] David Hughes, "Syracuse Wing Finds F-16A Effective in Close Air Support," *Aviation Week & Space Technology*, 18 June 1990, 36-42.

[3] Capt Leon E. Elsarelli, "Minimizing Bomb Errors in the A-10 LASTE 4.0 Expanded Mode," *USAF Weapons Review* 45, no. 2 (Summer 1995): 21.

[4] Carole A. Shifrin, "TAC Demonstration Bolsters Support for F-16 in CAS Role," *Aviation Week & Space Technology*, 17 April 1989, 50.

[5] Bill Sweetman, "Close Air Support Fighters High, Helicopters Low," *International Defense Review* 25, no. 11 (1992): 1078.

[6] Hughes, 39.

[7] "Numbers and Techniques Guide," 81 Fighter Squadron, n.d.

[8] James P. Coyne, *Airpower in the Gulf* (Arlington: Air Force Association, 1992), 103.

[9] William B. Scott, "AFTI F-16 Completes CAS Test, Demonstration Phase," *Aviation Week & Space Technology*, 2 April 1990, 38.

Chapter 3

The Decade in Review

On 17 January 1991, coalition air forces swept across the Kuwait and Iraqi borders to open one of the greatest aerial battles of modern history. It would prove to be an auspicious beginning to a decade of conflict across a magnificent spectrum. From humanitarian food relief efforts in Somalia to the skies over downtown Baghdad, U.S. military forces faced a variety of new challenges in the post-Cold War era. Some of the military lessons were learned at minimal cost. Others were paid for in blood. While these lessons may not provide definitive direction to the future of military conflict, they do provide clues to some of the challenges that may await us in the early years of the next century. Of particular interest to this research, is the level of capability that has dominated the military infrastructure of U.S. adversaries.

This chapter will examine the CAS lessons of Desert Storm and how these lessons apply to other conflicts of the decade. The intent is to show that, despite the high technology nature of the Gulf War, coalition forces never adequately controlled the low altitude environment despite overwhelming air power. Further, it will demonstrate that CAS forces were still required to support ground maneuver units despite the relentless pounding of enemy positions prior to the ground war. When this fact is coupled with U.S. experiences in other conflicts of the decade, it will be seen that the specialized

capabilities described in the previous chapter have been a required component in all U.S. military conflicts of the current decade.

Desert Storm

Iraqi Defenses

At the opening of Desert Storm, coalition aircraft faced extensive Iraqi air defenses incorporated into a complex and fully integrated air defense system (IADS). The area immediately around Baghdad was reported as more heavily defended than Hanoi during the height of the Vietnam War.[1] In addition to formidable radar SAM batteries, the Iraqi military possessed a wide range of IR guided missiles and air defense artillery. These systems included 160 SA-2s, 140 SA-3s a variety of SA-6, -7, -8, -9 and -14s along with 100 Roland self-propelled air defense systems and 4,000 AAA guns.[2] The Iraqi air force was no less formidable, consisting of 809 combat aircraft including first line soviet aircraft such as the MiG (Mikoyan-Gurevich)–29 and MiG-25 as well as French built Mirage F-1s.[3] How then were coalition leaders able to claim air superiority at the end of the first day of fighting and complete air supremacy a mere 10 days later?[4]

While detailed analysis and targeting of the Iraqi IADS was a key element to coalition success; advanced technology drove the plan. Precision weapons, stealth technology and computer driven command and control allowed coalition forces to dismantle Iraqi defenses while remaining outside threat envelopes and preventing high losses of strike aircraft.[5] Advanced F-15 fighters swept the skies of Iraqi aircraft, destroying some and causing the bulk of the Iraqi air force to flee to neighboring Iran.[6] Air Force MH-53 Pave Low and AH-64 Apache helicopters from Task Force Normandy

slashed a hole in the Iraqi early warning radar system. In turn, F-117 stealth fighters flooded through the gap to finish the job of blinding the Iraqi command and control system.[7] Once coalition forces mastered the skies over Iraq and Kuwait, other coalition aircraft were free to target the fielded forces of Saddam Hussein and set the stage for the ground offensive that would commence on 24 February 1991. Advanced technology had paved the way to victory. From this performance, we can see that a thesis advocating specialized CAS forces is clearly incorrect and advanced technology not only is but also should be the driving force behind future air power development. This, however, would be a premature conclusion.

Clearly, advanced technology was essential in gaining control of the air in Desert Storm. What is not so clear is the assertion by General H. Norman Schwarzkopf, on 27 January, that allied forces had achieved air supremacy.[8] According to Joint Publication 1-02, air supremacy is defined as "that degree of air superiority wherein the opposing air force is incapable of effective interference."[9] Yet, up until the beginning of the ground offensive, strike aircraft were directed to employ at medium altitudes above 10,000 feet to avoid Iraqi AAA and IR SAM systems.[10] These systems were proving to be highly capable of interfering with coalition aircraft.

Table 1. Desert Storm Aircraft Casualty Rates

Aircraft	Total Casualties	Total Strikes	Aircraft Casualty Rate Per Strike
O/A-10	20	8,640	0.0023
F-16	7	11,698	0.0006
F-15E	2	2,124	0.0009

Source: United States General Accounting Office, *Operation Desert Storm Evaluation of the Air Campaign* Available from http://www.fas.org/man/gao/nsiad97134/index.html.

Of the total number of aircraft destroyed or damaged by enemy fire in Desert Storm, 81% were attributed to AAA and IR SAM systems. This number is nothing short of staggering considering the altitude restriction imposed on strike aircraft to avoid these threats. The fact that the low altitude environment still belonged to the Iraqi defenders is not the only lesson to be learned from these casualty statistics. Table 1 demonstrates that higher technology strike fighters, such as the F-15E and F-16, enjoyed a much lower casualty rate than their less sophisticated A-10 counterpart. Again, on face value, technology triumphs. On the other hand, Table 2 shows a different view of these numbers. Designed for CAS, the slow and ungainly A-10 was undoubtedly an easy target for Iraqi defenders. However, the heavy armor and redundant systems of the A-10 allowed it to absorb this damage and still return the pilot to friendly territory.

Table 2. Desert Storm Aircraft Recovery Rates

Aircraft	Aircraft Hit	Aircraft Recovered	Percent Recovery
O/A-10	20	16	80%
F-16	6	3	50%
F-15E	2	0	0%

Note: Of the 16 A-10 aircraft recovered, 3 of them did not return to action. Of these three, two recovered safely. The other aircraft was destroyed and the pilot killed during the attempted landing.
Source: United States General Accounting Office, *Operation Desert Storm Evaluation of the Air Campaign* Available from http://www.fas.org/man/gao/nsiad97134/index.html.

The above discussion is critical to understand when it comes to CAS. Despite the success of modern technology in defeating the Iraqi IADS, coalition forces failed to achieve air superiority, much less air supremacy, below 10,000 feet. As previously seen, freedom to employ in this altitude block is vital to CAS operations. Finally, aircraft designed to operate in this airspace must be capable of withstanding punishment from less sophisticated air defense systems such as AAA and IR SAMs.

100 Hours of CAS

Another important lesson for CAS in the Gulf War is that despite the success of air power, the introduction of ground troops was ultimately required to bring the war to a successful conclusion. During the course of Desert Storm, over 23,400 strike missions were directed against Iraqi ground forces.[11] Of these, 1,050 Air Force and 750 Marine sorties were flown in direct support of coalition ground forces during the 100-hour ground offensive.[12] This number of CAS sorties seems quite small when compared to the overall number of 23,400 strike missions. Sortie averages, however, tell a far different story. When comparing the 23,400 strike sorties to the 42 total days of the entire war, ground strike sorties represent an average of approximately 550 sorties per day. The same analysis of CAS sorties over the period of the 100-hour ground offensive results in an average CAS sortie rate of approximately 430 sorties per day. The lesson should be clear. When ground forces are placed at risk, CAS assets are heavily tasked to provide support for their operations. Desert Storm also demonstrates that when such CAS requirements exist, air power will be required to fight in the low altitude environment.

As mentioned above, prior to the beginning of the ground offensive, strike aircraft employment altitudes were restricted to avoid AAA and IR threat systems. This limitation made inherent sense during the days prior to the ground war. Since precision weapons could be employed accurately from long distances, altitude restrictions probably prevented the needless loss of many strike aircraft. Yet, as soon as ground troops were employed, Lt. Gen. Charles A. Horner (Commander, Air Force Component, Central Command) summarily lifted this restriction.[13]

It was clearly recognized that the low altitude environment would be required to separate friendly from enemy forces and ensure effective CAS operations. In this case,

the threat presented by AAA and IR SAM systems had to be weighed against the possible losses of ground units that might be experienced if not adequately supported from the air. The magnitude of this situation as a lesson for CAS can not be understated. When ground forces are placed in harms way, CAS aircraft will be expected to take the fight to the enemy regardless of the threat situation at lower altitudes. When this fact is combined with the information presented in Table 1 and 2, the critical lesson emerges. CAS aircraft must be able to fight and survive in AAA and IR SAM environments. This lesson held true even in Desert Storm's political atmosphere of minimizing aircraft losses. The reason for this fact can be found in the need to ensure the safety of friendly troops when employing air power in close proximity to their locations.

The First Rule of CAS

The phrase "friendly fire" is perhaps the most serious term in the CAS vocabulary. From their first day of training, CAS pilots are ingrained with the concept that fratricide is the ultimate failure of mission execution. Despite this effort, mistakes are made in combat and Desert Storm was no different. Of the 247 battle related deaths in Desert Storm, 35 of these casualties were the result of friendly fire. Air-to-ground fratricide accounted for 11 of these losses.[14] Given the scale of Desert Storm operations, this number may seem quite low. However, when placed in context of total coalition casualties, 11 cases of air-to-ground fratricide become a disturbing 4.5 percent. Of all of the lessons from Desert Storm, the problem of fratricide on the technological battlefield is the most applicable to CAS operations. For this reason, friendly fire issues deserve special consideration.

The primary defense against fratricide in the Gulf War was a large inverted "V" marking placed on the sides and top of coalition vehicles. This marking system was quite effective for close vehicle-to-vehicle combat. Unfortunately, such marking systems do nothing to help pilots flying over the battle area. Even in the low altitude environment, visual markings such as these are nearly impossible to distinguish from the air.[15] To solve this problem, CAS pilots are required to "build a picture" of the battlefield and visually confirm the spatial relationship between enemy and friendly forces. The simple fact is that air delivered weapons in the Gulf War could be accurately employed well beyond the range of accurate visual identification.[16] This ability certainly allowed aircraft to employ beyond the range of threat systems and resulted in significantly lower combat losses from enemy fire. The lesson for CAS forces is that such wonders of modern technology do little to help pilots that must get very close to their work in order to separate friendly from enemy targets. Still, two aspects of this issue must also be considered if we are to maintain a balanced view of the lesson to be learned.

First, the extremely low number of overall casualties must temper the high percentage of fratricide cases. Had Iraqi forces been more successful in engaging coalition forces in combat, the percentage of friendly fire incidents would not appear nearly so dramatic. Second, the very accuracy of precision guided weapons greatly increases the chances of a hit when a target is engaged.[17] This fact holds both a positive and negative lesson for CAS employment. On one hand, precision munitions allow employment ranges that may be larger than appropriate when friendly and enemy forces are in close proximity. On the other, used properly and at closer ranges than simple threat analysis may dictate, these advanced weapons possess the capability to ensure that

weapon effects are confined to enemy forces. Such analysis must be clearly understood and properly applied when considering the advisability of equipping CAS aircraft with modern precision weapons. The use of these weapons greatly increases the chance of a fatal hit on the target. Unfortunately, if pilots employ these weapons at ranges beyond effective visual identification, this increased lethality will apply to an unintended friendly position just as readily as it will for an actual enemy target.

Of course, readers familiar with Desert Storm fratricide accidents will be quick to point out that the worst air-to-ground friendly fire incident occurred when an A-10 CAS aircraft inadvertently struck a U.S. Army vehicle. Seven American soldiers were killed.[18] The contradiction in this tragic event is that the aircraft in question was one of the very specialized CAS aircraft previously advocated. Still, the opposite conclusion must be given due regard. If a specially trained pilot and dedicated CAS aircraft can be responsible for such an event, how much greater is the risk for less capable platforms? In reality, the cause of the incident was attributed to a malfunctioning Maverick missile. Regardless of the cause, such an accident ultimately confirms that the tragic loss of any soldier to fire from his comrades must be viewed and analyzed with the greatest concern.

Hiding Behind a Grain of Sand

By this point, the difficult and sometimes disastrous result of attempting to provide CAS to friendly troops should be evident. Yet, despite the incidents of fratricide, the Persian Gulf environment was uniquely suited to simplifying the problem of friendly identification. Target areas were relatively flat and contained no vegetation that would obscure targets in other areas such as Eastern Europe, the Balkans or North Korea.[19] Vehicles caught in the open desert fell easy prey to coalition air power. Yet, when enemy

and friendly units came into close contact, the resulting confusion still resulted in incidents of fratricide. The disturbing reality of this fact is that despite a consummately favorable environment, even specialized CAS forces were still tested to their limits when faced with troops in contact situations. Had conditions favored enemy concealment, the challenge for CAS forces would have been tremendously increased.

The cover letter of a Government Accounting Office evaluation of air power in the Gulf War warns:

> …the environmental and military operating conditions for aircraft and weapon system performance are unlikely to be repeated outside southwest Asia and because future potential adversaries—not the least, Iraq itself—are likely to have learned a good deal about how to reduce the effectiveness of guided weapons.[20]

This fact holds sinister implications for battlefields with less permissive environments. As if to prove the validity of such observations, post Desert Storm conflicts would seek to find far more complex battlefields with which to challenge CAS forces

The Decade Continues

While Desert Storm was the most extensive and spectacular U.S. conflict of the decade; it was certainly not the only U.S. military venture. Ethnic conflict in the Balkans, government turmoil in Haiti and famine in Somalia also possess lessons for CAS employment. The nature of each of these conflicts shows the wide range of contingency operations that have plagued U.S. national security strategy since the end of the Cold War. They also stand in stark contrast to the Gulf War environment and demonstrate the need to refrain from assuming that the scenario of Desert Storm is applicable to all future air power requirements.

Bosnia-Hercegovina

On the heels of Desert Storm, Bosnia-Hercegovina declared independence from the former Yugoslavia in 1992. The resulting civil and ethnic war resulted in 145,000 civilian casualties and an estimated two million refugees by mid-1995.[21] Such widespread devastation prompted U.S. involvement in the crisis and eventual commitment of ground forces to stabilize a fragile peace agreement. The purpose here is not to become embroiled in the issues of the Bosnian conflict. Rather, the focus is on the fact that this region has been another testing ground for national political and military policy and also offers clues as to the future possibilities for CAS operations.

Unlike the deserts of the Persian Gulf, Bosnia is a mountainous country with thick vegetation and rudimentary transportation infrastructure. A report to Congress presented the tactical situation in this way:

> Trucks are confined to a few mountain roads (some are goat trails) and trains to single-track railways that cross mountain walls. Constant maintenance would be required to keep them open. Bottlenecks abound. Saboteurs could pick and choose from hundreds of bridges and tunnels that, if badly damaged or destroyed, would be time-consuming and costly to restore. Any campaign to drive enemy artillery beyond range of U.N. airfields and supply points would be lengthy and would change the nature of the conflict.[22]

Such an environment is a far cry from the open deserts of the Persian Gulf. Targets in Bosnia have the ability to hide in dense foliage, disperse in mountainous terrain and select from a variety of advantageous engagement areas. Such tactics, alone, do not necessarily negate the use of precision air power. They do, however, allow enemy forces to lay in wait and force close combat with friendly ground forces. To date, such fighting has been prevented by the fragile peace that exists in the country. Should the peace fail, CAS forces will face tactical situations more reminiscent of Vietnam than of Desert

Storm. While the environment of Bosnia is quite different from the Persian Gulf, defense systems available to Balkan Forces have some striking similarities.

In addition to radar guided SAMs, Serb and Croat forces possess a variety of IR guided SAM systems and a vast number of AAA pieces. These systems include SA-6, -7, -9, -14 and –16s as well as air defense guns ranging in caliber from 20mm all the way to 90mm.[23] As already shown, coalition forces failed to defeat these systems in Desert Storm. Is there any reason to believe the outcome would be better in the more difficult tactical environment of Bosnia? Employment in this type of threat environment will demand CAS forces that can survive these threats while operating in the very heart of their engagement envelopes. While Bosnia presents some similar challenges to Desert Storm, two other military operations of the previous decade have almost no resemblance to the Gulf War.

Haiti and Somalia

Operations Restore Hope and Uphold Democracy were certainly not battlefield laboratories in terms of air power or CAS. This is not to say that CAS forces were not required. It simply reflects the political decision to avoid the use of additional military force. As military operations other than war (MOOTW) continue to become an increasing concern for the U.S. military, it is logical to consider their implications for CAS forces

Both Somalia and Haiti possess such marginal military equipment as to be dismissed by strategic assessments.[24] In Somalia, the most complex threat system, termed "technicals," were little more than civilian vehicles with machine guns mounted on the back.[25] In Haiti, a heavy weapons company was the largest single military threat to U.S.

forces.[26] For MOOTW operations, the question becomes more an issue of targeting than survival in a sophisticated threat environment. Under these conditions, tactical targets become little more than rifle carrying infantry. Such targets prove difficult for ground forces to root out from defended positions. From an aerial perspective, CAS operations against infantry become a monumental exercise where current technology can provide little assistance.

The limited technology level of opposing forces in Haiti and Somalia combined with the unique difficulties of CAS operations in an urban environment resulted in very limited employment of air operations. Thankfully, both of these situations did not result in long term armed confrontations for U.S. ground forces. Still, one major engagement led to the deaths of 18 American servicemen and the eventual withdrawal of U.S. forces from Somalia.[27] This result issues a stern warning to prepare CAS forces now for similar operations that seem all too possible in the future.

Notes

[1] Michael R. Gordon and General Bernard E. Trainor, *The Generals' War* (Boston: Little, Brown and Company Limited, 1995), 112.

[2] Eliot Brenner and William Harwood, ed., *Desert Storm: The Weapons of War* (New York: Orion Books, 1991), 91.

[3] Ibid., 41.

[4] Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report* (Washington D.C.: Department of the Air Force, 1993), 56-57.

[5] James P. Coyne, *Airpower in the Gulf* (Arlington: Air Force Association, 1992), 8-11.

[6] Keaney, 12-13.

[7] Coyne, 8-11.

[8] Keaney, 56-57.

[9] Joint Chiefs of Staff, *Joint Publication 1-02, Department of Defense Dictionary* (Washington D.C.: Director for Operational Plans and Interoperability (J-7), 1997), 30.

[10] Keaney, 16.

[11] Gordon, 13.

[12] Coyne, 171.

[13] Ibid., 22.

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[14] Ibid., 103.

[15] Ibid., 103.

[16] Ibid., 103.

[17] William Head and Earl H. Tilford, Jr., *The Eagle in the Desert* (Westport: Praeger Publishers, 1996), 282.

[18] Coyne, 103.

[19] Henry L. Hinton, "Operation Desert Storm Evaluation of the Air Campaign," *Report to the Ranking Minority Member, Committee on Commerce, House of Representatives* (Government Accounting Office, NSIAD-97-134, June 1997): Available from http://www.fas.org/man/gao/nsiad97134/letter.htm.

[20] Ibid., Available from http://www.fas.org/man/gao/nsiad97134/letter.htm.

[21] John M. Collins, *Bosnian Brierpatch: Military Options Mid-1995*, Report for Congress, Congressional Research Service (1995): 1.

[22] Ibid., 5.

[23] Dr. John Chipman, *The Military Balance 1996/1997* (London: Oxford University Press, 1996), 81.

[24] Ibid., 224, 263.

[25] Kenneth Allard, *Somalia Operations: Lessons Learned* (Washington D.C.: National Defense University Press, 1995), 36.

[26] Maj Gen Michael C. Short, *Operation Uphold Democracy Joint After Action Report* (Washington D.C.: U.S. Atlantic Command, 1995), 13.

[27] Allard, 20.

Chapter 4

The Decade of the Future

> *As we look to the future of war we must face one absolute certainty: any projection will prove faulty.*
>
> —Colonel Jeffery R. Barnett

Identifying the strengths and limitations of CAS lessons from the previous decade is of limited use if no attempt is made to understand their implications for CAS operations of the future. Before undertaking such an analysis, it is necessary to identify what this future will look like in terms of military force employment. In the absence of time travel or a crystal ball, any such prediction will certainly contain errors of both omission and commission. However, in the absence of major political events such as the fall of the former Soviet Union, there is little reason to assume that the challenges of the current decade will be dramatically different in the years ahead. Future conflict will surely include major theater wars such as Desert Storm. Yet, if the current decade is indeed an indicator, we can expect the majority of military conflict to revolve around smaller contingency operations similar to Bosnia, Haiti and Somalia.

Major Theater Wars

As competition for limited world resources intensify, it can be assumed that these environmental stresses will bring states into conflict. Three major reasons for this fact

are that peaceful conflict-resolution mechanisms may prove inadequate, many such conflicts will stir strong nationalistic emotions and tangible resources allow military might to be applied for a clear and specific purpose. Examples of these possibilities include oil reserves in the Persian Gulf, water supplies in the Arab-Israeli region and commercial access to the South China Sea. [1] Nations involved in these areas already have and are continuing to improve technology based military capabilities that will pose a significant threat to any application of air power.[2]

Our own national security strategy recognizes these potential threats and describes the need to be able to engage in not one but two major theater wars (MTW) with overlapping time frames.[3] Should such conflicts arise, and there is no reason to suspect that they will not, air power will play a prominent role in any military outcome. The question for this research is what role will be expected of CAS forces? It would be nice if potential adversaries allow the same six months to prepare that Saddam Hussain granted coalition forces in Desert Storm. It would be nice to believe that through strategic planning it will be possible to isolate key centers of gravity and apply pinpoint pressure to these areas to force enemy capitulation.[4] The reality remains, however, that other nations can also learn from U.S. military experiences and a clear potential exists for warfare involving major clashes of ground forces. To critics who will ask where support for such a position is found, this author humbly points to the last 200 years of our national experience. Is the U.S. military really prepared to say that humanity has lost the will to fight major wars involving ground armies? If so, why do so many of these standing armies still exist today?

Ethnic Wars

Somewhere between the extremes of MTW and MOOTW, there exists a conflict set that has come to be regarded as "ethnic wars." Whether this term or the more historical description of "civil wars" is used, the fact remains that such conflicts will continue to plague world politics. Any number of current conflicts will validate that these types of wars will be prevalent for the foreseeable future. Military confrontations in Yugoslavia, Angola, Burundi, Afghanistan and Georgia are but a few of the better-publicized conflicts that ensure ethnic conflict will remain high on the list of future trouble spots.[5]

Such conflicts pose a difficult problem for air power. In many of these situations, enemy forces are composed mainly of light infantry units due to the appropriateness of terrain, the ability to rapidly deploy in a crisis or simply because of the economic basis of support for these military forces. Supporting such scenarios place unique constraints on the application of air power and CAS in particular. These problems include close proximity of adversaries, target acquisition difficulties and very short response requirements.[6] While these barriers will make up a portion of air power requirements in ethnic war situations, they will be the primary focus of military requirements for MOOTW.

Smaller-Scale Contingencies

Regardless of whether small operations are identified as MOOTW or the latest designation of smaller-scale contingencies is applied, these events will be the most prevalent military missions of the coming decade. U.S. national security strategy identifies this fact and defines these events as encompassing the full range of military options for humanitarian assistance, peacekeeping, disaster relief and no-fly zones.[7]

History has already shown that the identification of a cohesive military target in these cases is often difficult and politically sensitive.

In Joint Publication 3-07, it becomes immediately apparent that U.S. forces face a variety of low technology threats in the MOOTW environment. Yet, in every section of this document, military commanders are warned to prepare to exercise force or the threat of force should conditions deteriorate to unacceptable levels.[8] Clearly this does not advocate immediate escalation to air strikes with precision guided weapons. Air power assets of the future must be just as capable of a graduated response in these situations as ground units, or they stand little chance of contributing to an acceptable outcome.

The Key to the Future—Flexibility

If the above discussion proves anything, it is that future warfare will continue to occur over a broad spectrum. U.S. military forces of the future must be capable of action within the context of all of these possible scenarios. Unfortunately, a weapon system designed specifically for deep penetration in a radar environment may be quite useless in targeting armed militias attempting to impede food distribution to starving refugees. This is perhaps the most important and valuable lesson from the experience of Desert Storm. Even in this technology based conflict; analysts are quick to point out the value of flexibility:

> The mix of available aircraft types enabled the United States and the coalition to successfully attack or put pressure on a variety of targets and target types; at various times of the day and night; in urban, marine, and desert environments; with various guided and unguided munitions. Even including the platform and munition preferences discussed above, no target category was exclusively struck by a single type of aircraft, and no type of aircraft or munition was exclusively used against a single type of target or target category.[9]

Despite this fundamental finding, recent procurement programs have been tending toward multi-role aircraft and the gradual removal of specialized platforms that allowed such admirable flexibility in the Gulf War. Of the 7 different types of strike aircraft employed by the USAF in Desert Storm, two have seen tremendous reductions in total numbers of airframes (B-52 and A-10) and two have been phased out of the current inventory all together (F-4G and F-111F).[10] Even more disturbing to the concept of flexibility is the fact that current aircraft development for the future is based entirely on the F-22 and the Joint Strike Fighter. While these aircraft provide unique technological capabilities against advanced adversaries, their viability against the more predominate low technology threats remains in serious question.

Notes

[1] Patrick M. Cronin, ed., *2015: Power and Progress* (Washington D.C.: National Defense University Press, 1996), 80.

[2] Dr. John Chipman, *The Military Balance 1996/1997* (London: Oxford University Press, 1996), 120, 170.

[3] President William J. Clinton, *National Security Strategy for a New Century* (Washington D.C.: The White House, 1997), 12.

[4] Col John A. Warden III, *The Air Campaign* (Washington: NDU Press, 1988), 34-50.

[5] John L. Petersen, *The Road to 2015* (Corte Madera: Waite Group Press, 1994), 274.

[6] Lt Col L.C. Rush, Jr., "Close Air Support Challenges for the Air Force and Army in 2010 Battlespace" (Master's thesis, Naval War College, 1997), 35.

[7] Clinton, 12.

[8] Joint Chiefs of Staff, *Joint Publication 3-07, Joint Doctrine for Military Operations Other Than War* (Washington D.C.: Director for Operational Plans and Interoperability (J-7), 1995), 1-3.

[9] Henry L. Hinton, "Operation Desert Storm Evaluation of the Air Campaign" *Report to the Ranking Minority Member, Committee on Commerce, House of Representatives* (Government Accounting Office, NSIAD-97-134, June 1997): Available from http://www.fas.org/man/gao/nsiad97134/letter.htm.

[10] Ibid., Available from http://www.fas.org/man/gao/nsiad97134/letter.htm.

Chapter 5

Conclusions

The requirements that make CAS such a specialized and demanding mission have not changed over time. As long as U.S. military ground forces have looked to the air for close support, low altitude survival, loiter time, munitions capabilities, specialized CAS training and fratricide have been issues for CAS forces. The simple truth is that even the staunchest advocates of multi-role aircraft admit that CAS requires unique mission elements. Their argument is that high technology, multi-role fighters can adequately fulfill these tasks. The conflict arises over what should be considered "adequate."

As declared in the opening of this paper, no attempt is being made to advocate one aircraft at the expense of other alternatives. Indeed, nearly all, current and projected U.S. Air Force fighter aircraft have some ability to conduct CAS operations. The point is that, as in all questions of capability, some aircraft are better suited to given missions. What has been clearly shown is that the demands of effective CAS are so unique that they have little in common with other air combat tasks. If a specific aircraft is optimized for CAS employment, it will possess few superior capabilities for other missions. The A-10 Thunderbolt is a perfect example of this fact. Designed specifically for CAS, the A-10 is the most capable close support platform in the current inventory. Unfortunately, the design attributes that make it such a capable CAS aircraft result in limiting any inherent

capability to perform other missions. In the final analysis, force planners must decide if dedicated CAS forces will provide enough benefit on future battlefields to justify their procurement and expense. Such a decision requires the inclusion of the second set of facts presented in this research effort.

U.S. military conflict over the last 10 years has been replete with events requiring armed intervention by ground forces. This is a simple testimony of documented history. During this period, Desert Storm stands alone as the only MTW involving the U.S. military. Yet, even this experience shows that ground troops were ultimately required and that dedicated CAS forces were committed to support their operations. Despite the use of these forces, crucial and sometimes tragic lessons demonstrated that the challenges, even for specialized CAS aircraft, were sometimes greater than proven abilities. Yet, Desert Storm was only one of numerous military interventions during this period.

The remainder of U.S. military experiences during this decade demonstrates that, more often than not, U.S. adversaries presented such low technology infrastructure as to defeat any requirement for ultra advanced air power platforms. As a result, ground troops were required to support U.S. interests in these conflicts. Thus, the need for the introduction of ground forces has been a proven constant of military operations throughout the decade. Future trends only point to more of the same possibilities.

As first world powers become increasingly interdependent in terms of economic, political and technological power, the specter of major warfare between these groups has diminished. Is the result an increasingly stable world environment? While arguments rage on this issue, nearly every participant in world events agrees that the future is

fraught with uncertainty. Given such uncertainty and based on recent military experiences, it must be conceded that future military conflict has the distinct possibility of presenting the U.S. with protracted ground engagements. With such a highly potential future, the U.S. Air Force must conclude that dedicated CAS forces will provide tremendous assets, in terms of combat flexibility.

The road to choosing how to implement such force structure requirements will be a long and arduous task. However, one thing is certain. CAS forces should continue to be designed as they always have—specialized, heavily armored, and hard hitting aircraft with pilots skilled in the abilities of surviving and employing over the battlefield for long periods of time. While the A-10 indeed fits this requirement, it is an aging platform that sustained numerous hits in Desert Storm. If the A-10 is to supply our CAS needs for the extended future, it must be revitalized with modern avionics and improved defensive capabilities, as well as fully integrated with other technological advances in modern combat systems.

Extensive modifications to the A-10 will be expensive and time consuming. The Institute for Defense Analysis has found that the most cost effective way for meeting this challenge is to design and produce a completely new CAS aircraft. This program would cost an estimated $15 billion for 700 to 1000 aircraft. While this number appears staggering in the face of current military budget cuts, it is only a small fraction of the currently proposed budget for the Joint Strike Fighter.[1] If such a solution is not adopted and force planners continue to advocate multi-role fighters, the Air Force must understand the resulting limitations to CAS capabilities.

The most important point to take from this research is that Air Force policy must recognize the unique nature and requirements for effective CAS. In addition, any solution must be evaluated against the requirement to accurately deliver weapons where ground troops face the potential danger of fratricide. Failure to do so will put ground forces at risk and increase the political pressure that results from the loss of American soldiers in combat.

Notes

[1] John D. Morrocco, "Study Supports Call for Design of New Close Air Support Aircraft," *Aviation Week & Space Technology*, 28 September 1987, 29.

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